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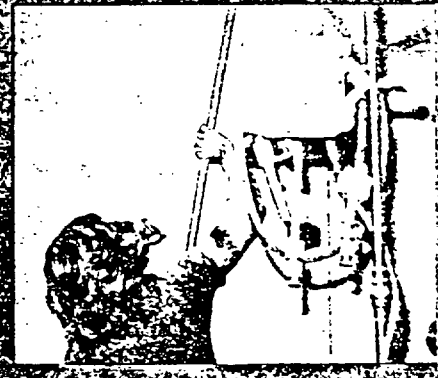

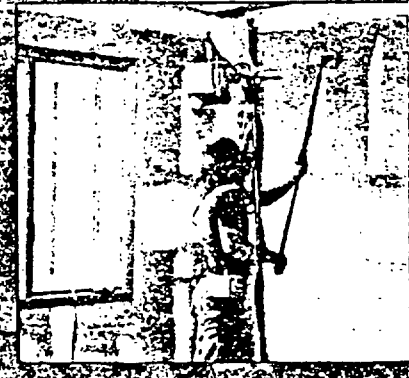

Asbestos & Silica Dust in the Drywall Industry. Business–Health–Life Part 1

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ASBESTOS AND SILICA DUST

OSHA Regulations and Exposure in Drywall Operations

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Introduction

This two-part article is intended to acquaint drywall contractors with the current and proposed regulations governing the use of products containing asbestos and crystalline silica.

The concluding article in the next issue will present data on the exposure to airborne asbestos and crystalline silica (quartz) during the sanding of tape joint compound. A total of seven industrial locations were tested. Exposures to asbestos during the wet-out of dry-mix compounds and during cleanup will also be shown.

BACKGROUND AND CURRENT STATUS— OSHA ASBESTOS REGULATIONS

The Williams-Steiger Occupational Safety and Health Act was passed in 1970 with the stated objective of assuring, insofar as feasible, every American worker a safe and healthy workplace. Under the provisions of this act, the Secretary of Labor issued an emergency temporary standard for exposure to asbestos dust on December 7, 1971. After extensive public hearings, a permanent standard, effective July 7, 1972, was promulgated.

The asbestos standard and the methods used by OSHA to develop it were immediately subjected to a massive legal attack by the Industrial Union Department, AFL-CIO. In addition to the law suit, OSHA was under continued pressure from other labor groups, public interest groups, and spurred on by the news media to make revisions. It was also recognized that this was the first health standard written. As such, there were parts that were vague, parts that were impractical to enforce, and parts that were overly restrictive without a corresponding benefit in protection for the worker.

During 1973, OSHA decided that the asbestos standard should be altered. The initial concept was to replace it with a series of mandatory work practices that would minimize the admittedly cumbersome monitoring requirements. The asbestos industry was asked to submit proposed work practices and a technical committee was formed under the auspices of the Asbestos Information Association/ North America. This committee consisted of representatives from about a dozen asbestos producers and large manufacturers of asbestos-containing products. Communication was also maintained with trade associations that used asbestos or its products. A draft work practice for joint taping was drawn up and submitted to the GDCI for comment.

The technical committee drafted several broad work practices relating to the handling of asbestos. It soon became evident that a large number of specific work practices would be needed to cover the wide range of industrial situations where asbestos or asbestos-containing products were used. The committee also examined and recommended changes in the portions of the regulations that were vague or overly restrictive.

The IUD decision was announced in mid 1974 by the United States Court of Appeals for the District of Columbia. The court generally upheld the OSHA position in the matter and noted that, although the Congress had poorly defined the procedures to be used to set such standards, OSHA had used proper methods to collect and evaluate the conflicting evidence presented. The judgments made to arrive at the standard were within the discretion granted to OSHA; and, more particularly, the court said that it was correct and proper to consider economic factors. Two points were remanded for further consideration; those relating to record retention and the time allowed for compliance.

After the court decision, OSHA materially altered their position on the revision of the asbestos regulations. Under heavy pressure to issue health regulations for other substances, a decision was made to amend the asbestos regulations only to the extent needed to clarify ambiguities. No changes were to be proposed in the allowable exposure levels. Many of the suggestions for clarifying language made by the AIA/NA Technical Committee were understood to have been accepted.

The redrafting of the regulation along these lines was apparently completed in late 1974 and the results were submitted for review to various governmental departments as required by law and policy. During 1975 key personnel changes occurred at policy making levels in both OSHA and NIOSH. At some point, apparently quite recently, the decision was made to drop the amendment concept and reopen the entire asbestos and health controversy. This information became

public when the proposed changes were published in the Federal Register on October 9, 1975.

The asbestos standard that was promulgated on June 7, 1972 and which is still in effect can be divided into seven main categories:

1. Sets the maximum allowable airborne asbestos concentrations in the workplace at a ceiling level of 10 fibers/cc longer than 5 micrometers and at a time-weighted average (TWA) for an 8-hour shift of 5 fibers/cc longer than 5 micrometers. The TWA drops to 2 fibers/cc longer than 5 micrometers in July 1976.
2. Defines the acceptable procedures to meet these standards.
3. Defines where personal protective equipment may be used and specifies the types available.
4. Specifies monitoring requirements and the procedures to be used.
5. Specifies requirements for caution signs, caution labels, and housekeeping procedures.
6. Requires medical examinations for all employees "exposed to asbestos."
7. Sets requirements for keeping of medical and monitoring records.

The standard was written in language that fits conventional fixed manufacturing locations. It presents some very real problems, however, when applied to the construction industry where the job site and the work force are transient. The areas of particular difficulty to drywall contractors are those dealing with monitoring and medical examinations. The AIA/NA Technical Committee recommended a cutoff level below which medical examinations were not required. It was also proposed that monitoring could be dropped where monitoring experience had demonstrated the levels to be consistently below the cutoff or where the asbestos had been properly modified by a bonding agent to prevent excessive dust.

The revised standard proposed on October 9, 1975 follows the same general pattern but differs in the following critical points:

1. The allowable exposure level is reduced to 5 fibers/cc longer than 5 micrometers ceiling and *0.5 fiber/cc* longer than 5 micrometers time-weighted average (TWA).
2. Monitoring and record keeping requirements are increased substantially although a provision to discontinue monitoring under certain circumstances is included.
3. There is no cutoff level on the medical examination requirement.

OSHA has reviewed the recent medical literature on asbestos and has proposed regulations based on a very strict interpretation thereof. They have not assessed the economic (inflationary) impact of the proposed regulations but have stated their intention to do so or certify that there is no impact before public hearings are started. The burden of proof has been placed on industry to demonstrate that these regulations are overly restrictive. There is no question that if they are promulgated as proposed, they will place a very heavy burden on asbestos producers and users. Appropriate responses will be submitted by various segments of the asbestos industry and other interested parties.

OSHA has stated in the Federal Register that the construction industry will *not* be covered by the newly proposed regulations. They will continue to operate under the present regulations until a new vertical standard for that industry is developed. This should not lead to a false sense of security, however, because the same medical conclusions on allowable exposure levels are applicable regardless of the industry where they occur. Also, the OSHA health regulations are rapidly moving towards a fixed format that will embody all of the same basic concepts regardless of the substance being regulated. It should be noted that the development of an asbestos standard for the construction industry is in progress and recommendations have been submitted to OSHA by the Advisory Committee for the Construction Industry.

PROPOSED OSHA REGULATIONS— CRYSTALLINE SILICA

Asbestos products do not constitute the only potential health hazard for the drywall industry. Tape joint muds contain crystalline silica which has long been recognized as the cause of a disabling lung disease called silicosis. The National Institute for Occupational Safety and Health (NIOSH) has prepared a Criteria Document relating to occupational exposure to crystalline silica and submitted it to OSHA on November 11, 1974. A proposed silica regulation has been drafted by OSHA and was to have been published during September 1975. The pressure on OSHA to prepare other regulations has delayed this publication but it will undoubtedly appear in a few months.

NIOSH recommended an allowable maximum exposure level to airborne crystalline silica of 50 micrograms per cubic meter of air ($50\mu g/M^3$). Medical examinations, extensive monitoring, record keeping, signs, warning labels, and other provisions similar to the asbestos regulations were also recommended. An action level of one half the allowable exposure limit was also defined as a cutoff point below which the regulations would not apply.

OSHA REGULATIONS— INERT OR NUISANCE DUST

Table G-3 of Section 1910.93 of the OSHA regulations as revised on June 7, 1972 lists the maximum allowable airborne concentrations of inert or nuisance dust as 5 milligrams/cubic meter (mg/M³) in the respirable fraction and 15 mg/M³ in the total dust. If a dust is below the allowable levels for asbestos and silica but above that for nuisance dust, the regulations have been violated. This regulation has been less widely publicized than those for asbestos and silica but has been in effect for a number of years. It must also be considered when job-site dust conditions are examined.

COMPOSITION OF TAPE JOINT COMPOUNDS

Tape joint mud, either dry in bags or already mixed in five-gallon containers, is a well-known material at the job site. Few applicators realize, however, what goes into a mud and how carefully the ingredients must be balanced to give the critical blend of properties necessary to make the mud work properly during application and after it has dried.

The ingredients in a typical ready-mix tape joint compound are listed below:

COMPOSITION OF TYPICAL READY-MIX TJC

Ingredient	Percent by Weight	
	Wet Basis	Dry Basis
Water	31	—
Limestone	41	60
Mica (and Clay)	16	23
Binder	7	10
Asbestos	3	4
Miscellaneous	2	3
	100	100

Looking at the dry basis, which represents the condition when the mud is cured, it can be seen that the principle ingredient is limestone. This is the bulk filler that keeps the cost of the product down. It does not impart any handling properties to the wet mud.

The next largest ingredient is finely-ground mica which is in the form of tiny flat plates. These tend to form a loose structure in the wet mud and have an important bearing on how the mud flows when trowelled and how it shrinks when it dries.

The other mineral ingredient is asbestos. It is present at a level of 3-5% and performs the function of controlling shrinkage and cracking when the mud dries. It is also very important to trowelling properties which allow the mud to form easily in thick sections and permits feathering of the wet edge. The most critical function of asbestos in most muds is to provide freeze-thaw stability. Muds which do not contain asbestos will generally be unusable after they have been frozen.

The binder in ready-mix is usually vinyl acetate, while casein, starch, or a similar "glue" is used in the dry mixes. It cures to hold the compound rigid and firmly attached to the wall.

The miscellaneous ingredients include such items as additives, fungicides, surfactants, cellulosic thickeners, and proprietary materials. These are important ingredients but will not overcome the effects of an improperly balanced blend of major components.

A compounder who wishes to formulate a mud without asbestos will have to replace it with a material that will impart similar properties. The mica can be increased or some other fiber-like material, such as certain clays, may also be used. Additional cellulosic thickener to give the necessary viscosity is also likely to be required. This has a tendency to make the viscosity unstable, i.e., correct at the plant when manufactured but either too high or too low when the mud arrives at the job site.

The reformulation problem becomes much more complicated when silica is considered. Four different limestones commonly used in the manufacture of TJC have been analyzed for crystalline silica content and found to range from 0.3 to 2%. Similarly, three different micas had silica contents of 2, 5, and 9%. While asbestos is usually free of crystalline silica, clays often contain substantial quantities.

By proper selection of ingredients, it is possible to produce a mud with a silica content as low as 0.3%. Unless the low silica ingredients are readily available mud costs will increase. Since silica appears everywhere in nature, it is unlikely that a tape joint mud can be prepared without detectable levels. If the proposed regulations are promulgated, workplace monitoring can be extensive and a considerable financial burden can be imposed on contractors.

Eleven commercially available muds were found to contain from 0.3 to 2.5% of crystalline silica which is consistent with the silica content of the raw materials. Very few mud suppliers appear to be aware of the potential silica problem.

It is well known that the major tape-joint compounders have had extensive research programs underway for the past several years to develop asbestos-free muds that work as well as those with asbestos. So far, the programs have had limited success. The muds developed are more expensive and generally do not perform as well. The formulations now in use evolved to their present high-performance level over many years and it is, obviously, difficult to replace the key functional ingredient.

The tape joint industry had their attention drawn forcibly to the asbestos standard in the Spring of 1974. A group at Mt. Sinai Hospital, led by Dr. Selikoff, announced the results of a study of 59 tapers who were members of Local Union 1974, Drywall Tapers and Pointers of Greater New York. The fiber counts found during sanding were generally very high and one longtime worker in the industry had a clearly recognizable case of lung fibrosis. The same data were transmitted to NIOSH who issued an alert to the industry.

At the time of this publicity, a major supplier of asbestos and other products to tape joint compound manufacturers had collected dust count samples during sanding at two locations in Florida. In contrast to the New York City results, the fiber levels found were low and well within the regulations. A possible reason for the difference can be found in the application and sanding conditions, i.e., hand-tool applied and heavily sanded in New York City compared with Ames tools and light sanding in Florida.

The question of different work practices was pursued further with various contractors. It was found that the amount of sanding done varied widely, even within a geographical area. It depended on the way the mud was applied, i.e., Ames vs. hand tools, the skill of the operator running the mud, the type of finishing coat to be applied to the wall, the size and quality of the job, i.e., custom or "mass production," the amount of ventilation, and the personal preference of the contractor. In addition to these mechanical factors, different mud formulations appeared to vary widely in their tendency to generate dust when sanded. In general sanding was minimized to reduce costs.

It was obvious that more information from other parts of the country was needed to better define the levels of asbestos exposure to be expected. With the assistance of the GDCI and the excellent cooperation of various individual contractors, field tests have now been run in New York, Texas, Michigan, and Minnesota. The New York, Michigan, and Minnesota sites were carefully selected to cover as wide a range as possible in the "intensity" of the sanding operation. Conditions varied from one man sanding lightly to three men sanding heavily in the same apartment. The New York tests also provide information on hand tool application. In addition to asbestos tests, air samples were collected at several of the locations to check the airborne concentration of crystalline silica (quartz) in the respirable fraction of the dust. The results of these tests will be presented in the January-February Issue.